UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/981,382	10/16/2001	Yuri Okunev	PCTEL-013	7619

			EXAMINER
36822	7590	04/04/2005	KIM, KEVIN

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ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/981,382	OKUNEV ET AL.
	Examiner	Art Unit
	Kevin Y Kim	2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 October 2001*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,9-11,13-15,18-21,23-28,32 and 34* is/are rejected.

7)☒ Claim(s) *6-8,12,16,22,29-31 and 33* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date *1/25/02*.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

U.S. Patent and Trademark Office

PTOL-326 (Rev. 1-04)   Office Action Summary   Part of Paper No./Mail Date 2162005

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   This application currently names joint inventors. In considering patentability of the

claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c)

and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2.   Claims 1-5,9-11,13-15, 18-21,23-28,32 and 34 are rejected under 35 U.S.C. 103(a) as

being unpatentable over Mui (US 4,547,887).

Claims 1 and 27.

Mui discloses an interleaver (10) included in a transmitter (though a digital interface

coupling the transmitter and a receiver is not shown, it is inherent in that a communication

device on each end is comprised of both a transmitting section and a receiving section coupled to

an interface), wherein the interleaver is a convolutional interleaver. It is well established that

convolutional interleavers distribute symbols in an codeword according to $dL(i) = (D-1)*i$, as

admitted in the present application (see page 2) see col. 1, lines 41-42: Furthermore, the

convolutional interleaver includes N-1 registers (12-1,...,12-I) for storing symbols of an

incoming codewords in parallel. As shown in Fig.1, the plurality of registers includes a plurality

of cells with each cell storing a symbol.

The claimed invention differs in that it includes "a permutation register" for storing indications of a static order in which symbols are either written into or read out from the plurality of registers whereas the prior art described in Mui patent uses a mechanical element (14,18) for performing the write/read tasks.   However, Mui further suggests that "an appropriate transistor switching network" could be used for the commutators (14,18).   Thus, it would have been obvious to one skilled in the art at the time the invention was made to use a "resister," which can function as an appropriate transistor switching network for performing the write/read tasks, as suggested by Mui.

Claim 2.

Since the N is the length of a codeword, a pumutation register, once used as suggested by Mui, would include at least "N-1 cells."

Claim 3.

Fig. 1 of Mui shows that "each said outgoing codeword has N sequential symbols, and a first of said N sequential symbols is taken from a first symbol of the incoming codeword." Note that the interleaver register structure of Mui is identical to that of the present application shown in Fig. 3, thus performing the same interleaving pattern.

Claim 4.

Each of symbols in Mui is "a byte," considering the lack of the definition by applicant.

Claim 5.

Mui does not limit, "N," i.e., the interleaver depth, to any specific number, thus

disclosing that any interleaver depth of choice may be used including the claimed "an odd

number greater than five." Furthermore, just like the interleaver structure of the present

invention (Fig.3), Mui shows N-1 registers that have one, two and tree cells respectively. See

Fig.1.

Claim 9.

Since the same structure of N-1 registers is used as described above, a total number of

interleaver memory cells is $(N-1)*[((D-1)/2) +1)]$.

Claim 10.

Mui discloses the registers in the itnerleaver implemented in shift registers. See col.1,

lines 62-67.

Claim 11.

Nui discloses a deinterleaver (38) including N registers. Although it is shown on

the other end of communication channel for illustration purposes, it is also included in the

transmitter as a receiving part of an interleaved codewords transmitted from the other end. The

registers are for storing symbols of an incoming interleaved codewords in parallel.

The claimed invention differs in that it utilizes the indications of the permulation register

in order to regenerate a deinterleaved codeword. However, since the deinterleave is a reverse

process of interleaver, it would have been obvious to use the read/write order of a permutation

register for interleaving for deinterleaving purposes as well.

Claim 13.

Although not described, the regenerated deinterleaved codeword by the deinterleaver (38) would have "N sequential symbols and a first of the N sequential symbols is taken from a first delayed symbold of the interleaved codeword" because the same convolutional interleaving of the claimed invention is used by Mui, as explained above.

Claim 14.

Each of symbols in Mui is "a byte," considering the lack of the definition by applicant.

Claims 15 and 28.

Mui does not limit, "N," i.e., the interleaver depth, to any specific number, thus disclosing that any interleaver depth of choice may be used including the claimed "an odd number greater than five." Furthermore, just like the interleaver structure of the present invention (Fig.3), Mui shows N-1 registers that have one, two and tree cells respectively. See Fig.1.

Claim 18.

Since the same structure of N-1 registers is used as described above, a total number of interleaver memory cells is $(N-1)*[((D-1)/2)+1)]$.

Claim 19.

Mui discloses the registers in the itnerleaver implemented in shift registers. See col.1, lines 62-67.

Claims 20 and 32.

Mui discloses a deinterleaver (20) included in a receiver (though a digital interface

coupling the receiver and a transmitter is not shown, it is inherent in that a communication

device on each end is comprised of both a transmitting section and a receiving section coupled to

an interface), wherein the deinterleaver is a convolutional deinterleaver. It is well established

that convolutional interleavers distribute symbols in an codeword according to $dL(i) = (D-1)*i$,

as admitted in the present application (see page 2) see col. 1, lines 41-42: Furthermore, the

convolutional deinterleaver includes N registers for storing symbols of an incoming codewords

in parallel. As shown in Fig. 1, the plurality of registers includes a plurality of cells with each

cell storing a symbol.

The claimed invention differs in that it includes "a permutation register" for storing

indications of a static order in which symbols are either written into or read out from the plurality

of registers whereas the prior art described in Mui patent uses a mechanical element (see

switches at input and output of the registers) for performing the write/read tasks. However, Mui

further suggests that "an appropriate transistor switching network" could be used for the

commutators. Thus, it would have been obvious to one skilled in the art at the time the

invention was made to use a "resister," which can function as an appropriate transistor switching

network for performing the write/read tasks, as suggested by Mui.

Claim 21.

Since the N is the length of a codeword, a pumutation register, once used as suggested

by Mui, would include at least "N cells."

Claim 23.

Although not described, the regenerated deinterleaved codeword by the deinterleaver (38) would

have "N sequential symbols and a first of the N sequential symbols is taken from a first delayed

symbold of the interleaved codeword" because the same convolutional interleaving of the

claimed invention is used by Mui, as explained above.

Claims 24 and 34.

Mui does not limit, "N," i.e., the interleaver depth, to any specific number, thus

disclosing that any interleaver depth of choice may be used including the claimed "an odd

number greater than five." Furthermore, just like the interleaver structure of the present

invention (Fig.3), Mui shows N-1 registers that have one, two and tree cells respectively. See

Fig.1.

Claim 25.

Since the same structure of N registers is used as described above, a total number of

interleaver memory cells is $(N-1)*[((D-1)/2)+1)] + D$.

Claim 26.

Mui discloses the registers in the itnerleaver implemented in shift registers. See col.1, lines 62-

67.

Allowable Subject Matter

3.   Claims 6-8,12,16,17,22,29-31 and 33 are objected to as being dependent upon a rejected

base claim, but would be allowable if rewritten in independent form including all of the

limitations of the base claim and any intervening claims.

Conclusion

4.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

   Yonge,III et al (US 6,397,368) discloses an interleaver/deinterleaver coupled to a digital interface.

   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Y Kim whose telephone number is 571-272-3039. The examiner can normally be reached on 8AM --5PM M-F.

   If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

   Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).